

seen of him alive by his party; his murder at Manwyne was evidently part of a scheme to attack and murder the whole party, who of course returned frustrated in their object.

It is not for us to enter into any discussion as to who are the real authors of the treacherous affair; so far as data permit, Sir Rutherford Alcock discusses the whole question, as well as shows the value of Margary and of his journey, in an Appendix. Whoever was to blame, Margary himself was blameless: it is difficult to regard his death as anything but an unrelieved loss: we trust her Majesty's Consular Service contains many like him.

OUR BOOK SHELF

Through Bosnia and the Herzegovina on Foot during the Insurrection, August and September, 1875. By Arthur J. Evans, B.A., F.S.A. With a Map and 58 Illustrations. (London: Longmans and Co., 1876.)

THIS is an opportune publication, and we recommend it to our readers as one that will give them a good and lively idea of the countries referred to and their various peoples—of much interest at present in connection with the Servian rising. Mr. Evans entered Bosnia at Brod on the Save, went leisurely south, with various divergences, through the country, reaching the sea near the mouth of the Narenta and coasting along to Ragusa. Mr. Evans mixed freely with all classes of the people wherever he went, is well acquainted with Bosnian, and indeed with general European history, is a discriminating ethnologist, and has a good knowledge of botany. He studied the features and habits of the people closely as he sojourned among them, and gives many notes that might be found of value to those who take interest both in Aryan and Turanian ethnology. The people are evidently capable of good things if they had the chance and were free from oppression; but Mr. Evans's observation confirms all that has been said as to the impossibility of the Turk ever treating a Christian subject with justice or even humanity, unless compelled. The book contains a map and many attractive illustrations, is interestingly written, and will give English readers a fair idea of a country that is almost as little known to the generality as the heart of Africa.



LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

Firths, Dales, and Lakes, Valleys and Cañons

IN NATURE, vol. xiii. p. 481, you honoured me by printing a notice of some writings on glacial subjects, and since then many pamphlets have been sent to me. I would gladly show that I have studied them. Though I do not believe in a "glacial period," I have convinced myself that local glacial climates, like the existing climate of Greenland and the "Arctic current" have prevailed in different regions at different times, and that marks of these "local glacial periods" include "valleys" of certain forms, with "firths" and "lake basins." Glaciation occupied the attention of the Geological Society at their last meeting, when Prof. Ramsay read an abstract of a paper, in which a foreign writer compared Greenland and Norway. So far as I understand that writer's views as to glacial action in general, I agree with him. Many writers hold opposite opinions as to "the usual evidence of powerful ice erosion," and "the alleged power of a glacier to excavate a depression in the earth's surface" (Judd), as to "abrasion," and "the inability of glaciers to excavate except under peculiarly favourable circumstances" (Bonney). Truth is learned by observation and by perseverance. A drop hollows a stone, not

by force, but by frequent falling, and that truth has become proverbial. A stream of water by flowing, and by rolling stones, makes a watercourse, and that truth is proved by every shower and in every gutter. By perseverance flowing water makes a deep watercourse. According to the latest official report of Dr. Hayden (June 4, 1876), streams which began to flow about the sources of the Mississippi, when the Rocky Mountains were raised, have gone on flowing ever since in the same channels, and some have worn cañons "from half a mile to a mile deep," not by force, but by frequent flowing. A glacier also flows. It is acknowledged that it wears and grooves rock, but still it is denied that a wide deep stream of flowing ice can make a wide deep furrow. It is said that ice "abrades," but does not "erode," that it cannot "excavate," unless under favourable circumstances. It is maintained that flowing ice cannot hollow out a basin, though flowing water does it on a small scale wherever it flows. Much is done by perseverance. As a drop hollows a stone, and water a watercourse, so ice makes an ice-channel slowly; and much repetition by glacialists may in time convince sceptics of that truth. Icebergs are the ends of glaciers pushed out into the sea, and there launched. Some of them are 3,000 feet thick. They prove their size by grounding in soundings off Newfoundland, and Labrador, and Greenland, and by their rate of flotation when they float with 300 feet above water, as "flat-topped islands of ice" in southern seas. A "glacier" cannot easily be measured on shore, but these vagrant fragments roughly measure parent glaciers. A pressure of 3,000, or of 1,000, or of 500 feet of ice upon sand or stone moving in an ice-channel is great abrading force. At the base of every ice-fall, or ice-rapid, the plunging ice-river must tend to "excavate," because falls and rapids of water excavate pools of various size proportioned to their power. The area of Greenland nearly equals that of India, and that area, so far as it is known, is covered with thick ice which is slowly moving seawards. The coasts are furrowed by deep hollows, of which most contain flowing glaciers, of which many enter the sea, and launch "islands of ice." Some "bergs" now float to the lowest latitude reached by northern drift-stones on shore in Europe and in America. I say nothing here about marine glaciation. The Greenland glaciers are flowing from an area where water generally falls frozen; they flow as rivers now flow from India, and all of them are slowly wearing their channels at some rate, and working up stream like Niagara Falls. There is no measure for the time during which these powerful ice-rivers of Greenland have been slowly hollowing stone by frequent flowing, unless it be the work of erosion done. It is denied that the work was done by the glaciers. Yet no rivers flow where ice fills the dales, and these Greenland dales have been "eroded," and bear "the usual evidence of powerful ice erosion," according to photography and descriptions. According to the clearest marks the whole Scandinavian peninsula, and the whole of Finland have at some time been covered by ice on the scale of Greenland ice. Sermitualik glacier, photographed by Mr. Bradford before 1870, is near Cape Desolation in Greenland, opposite to Shetland, Bergen, Christiania, St. Petersburg, &c. It is from three and a half to four miles wide where it enters the sea, and there it is about 800 feet thick. It extends inland as far as the eye can reach, and probably comes from the watershed of Greenland. Taking the ice to weigh only 55 lbs. per foot cube, the pressure above the sea-level on the ice channel is about 44,000 lbs. on the foot square. Between ice and rock are large stones, grit, and mud; and the rock is rounded where it is visible at the edge of the glacier, near the sea-level. The slopes between the lakes of Finland, and the gulf near Viborg, at the side of the Saimen canal, and elsewhere, are polished, striated, and rounded. I took rubbings in September, 1865, and recognised the work of ice on the scale of Greenland ice. In Norway the old marks are plain on the sides of firths and dales, and some lead back to glaciers, which still flow from large areas upon the watershed, which still are covered by considerable sheets of ice. In Greenland this engine is seen at work; in Scandinavia the work of the engine is better seen. That work is, first a rounded worn plateau about the watershed called the "fjeld;" second, a series of slopes much glaciated; and third, below these slopes, long grooves hollowed out of the solid, called "dales." In these dales rivers now flow to lakes and to firths. Of these rivers some have worn deep watercourses, and cañons proportioned to their size and age. At the bottom of the dales are hollows which are called lakes, and firths when they hold fresh or salt water; in the rivers are smaller

pools, which become ponds in dry weather. This northern country opposite to Greenland has been "carved" in this fashion by ice on the large scale, and afterwards by water-streams, and by the frequent falling of rain drops. It has also risen from the sea. The ice-cover has been taken off Scandinavia and Finland, and there it is possible to test theories about the work which an ice-cover is now doing on the present chief gathering grounds of snow throughout the world. But that Scandinavian work is the same kind of work which is found with small glacial marks elsewhere. Hollows have rounded sections , or when deep they are like U. Hills between hollows commonly are hog-backs , and generally the land is rounded, except where peaks rise, and cliffs have broken. But this kind of rounded sculpture exists only in some regions of the world, and it marks the site of local glacial periods, as I believe. Elsewhere the section of valleys is angular like V, or in cañon countries like Y. These angular grooves are known to be the work of streams, because every stream of water carves on the same plan. Rounded hills and dales are at first sight evidence of powerful ice erosion, but some kinds of rock weather in bosses. If it be admitted that a drop wears a stone, that a stream makes a deep cañon in a long time, and that a glacier "abrades" or makes any mark at all, it seems to follow that an ice-engine as large as India or Scandinavia has in fact done the large work which it might be expected to do by perseverance in working, as it is known to work, wherever snow now gathers in large masses. Given the hardly perceptible wearing of water and time, a cañon a mile deep and many hundreds of miles long has resulted from the flowing of a stream. Given glacial "abrasion" and time enough, than valleys of rounded section, and firths and lake-basins of a particular kind probably resulted from the flowing of ice.

There are plenty of hollows in the earth's surface which are not the result of erosion but of other causes with which I am not now concerned. Where a stream flows from source to mouth on a gradual slope, there has been no great disturbance of level since the stream began to work. Where ice fills the dales there are no cañons. Where ice has filled dales and has left fresh marks, cañons are short and small. In mountain regions where ice-marks are rare or absent, cañons are of great depth and length, apparently because their streams have flowed in the same channels ever since the mountains were raised. But where cañons are marked features, these lakes, firths, and dales of rounded section are very rare, or do not exist. It seems therefore that hollows which have, in fact, been carved out of the earth's surface may be known for water-work, or for ice-work by their shape, and that firths, dales, and lakes may mark the sites of local glacial periods; and cañons the sites of climates that have not been glacial since the streams began to flow. Perseverance may accomplish great results insensibly like ice in dales, water in water-courses, and drops on stone.

Let me counsel those who wish to study the works of ice on a large scale to abandon the retiring glaciers of Switzerland and study Nature in Norway. This is the best season for travelling there.

June 23

The Loan Scientific Collection at South Kensington

As a science teacher, privileged to attend the special demonstrations upon the extraordinary assemblage of apparatus now filling the galleries of the exhibition buildings, a list of some of which appeared in last week's NATURE, would you allow me to call attention to the provision of the department by which the general public may be admitted, if room, at a nominal charge.

Within the past few days my note-book shows that the original instruments of Sir Isaac Newton, Faraday, Fizeau, Wheatstone, Watt, Savery, Black, Cavendish, Guerické, and others employed in their classic researches, have been shown and explained (and used, so far as experimentalists would presume to touch such now almost venerated relics).

The spacious and well-appointed lecture-theatre has not been always crowded; but I have the impression that if the above regulation were widely understood there would be such a gathering, not of the merely curious, who would attend as at an entertainment in natural magic, but of those deeply interested in the topics discussed, as would prove too large for the accommodation at present provided; and, whilst scientific enrichment of the public would be more largely secured, a compliment would at the same time be paid to the directors for their great efforts to promote the success of this important undertaking.

The School of Science, July 6

WILLIAM GEE

Evolution of Oxygen by "Vallisneria Spiralis"

HAVE any of your readers noticed the rapid evolution of oxygen by a blade of *Vallisneria spiralis*? If a blade is cut or broken and held under water, the bubbles of gas are rapidly noticed issuing from the broken end, and by a simple arrangement of placing the broken blade or several blades into a test tube filled with water the water is displaced and the gas collected. After forty-eight hours the pores of the broken end of the blade close up and a fresh fracture is necessary to restore the evolution of gas, which also ceases at night only to recommence when the sunlight reappears. I have collected about a cubic inch of gas in eight hours from one blade of the plant. A confirmation of my experiment would please me.

Stroud, July 3

WALTER J. STANTON

Stamens of Kalmia

IF the beautiful spring trap formed by the stamens of the Kalmia, by which insect fertilisation is secured, has not yet been noticed, I may perhaps be allowed to call attention to it.

Cahirmoyle, Ardagh, Co. Limerick

C. G. O'BRIEN

Optical Phenomenon

FOR more than half an hour after sunset this evening there was a broad band of light rising vertically through a clear sky immediately above where the sun had set. It moved as the sun moved northward below the horizon, retaining its vertical position. It must have been formed at a very great height in the atmosphere, for it outlasted all the other sunset tints, which were very beautiful. It would be interesting to know whether this was seen from many places far apart.

JOSEPH JOHN MURPHY

Old Forge, Dummurry, Co. Antrim, June 27

The Cuckoo

WITH regard to the letter of Mr. Adair, in last week's NATURE, p. 210, on the cuckoo, I have only to observe that if it does not sing in Somersetshire after Midsummer it does *here*, in Middlesex; I heard it, to my astonishment, early in the morning of the 6th inst., in the woods and hills to the north. I never recollect its note so late, not after the 3rd.

Harrow, July 10

HENRY ST. JOHN JOYNER

OUR ASTRONOMICAL COLUMN

SHORT'S OBSERVATION OF A SUPPOSED SATELLITE OF VENUS.—This observation which, as it appears in the *Philosophical Transactions*, vol. xli. (NATURE, vol. xiv., p. 194), is mystified by a typographical error, is also found in "Histoire de l'Académie des Sciences, 1741," p. 125, where the micrometrically-measured distance of the suspicious object from Venus is given in what seems to be a more correct form, and as it was used by Lambert in his calculations. After referring to the observations of the elder Cassini in 1672 and 1686, the writer—probably Cassini II., author of "Elemens d'Astronomie"—states that Mr. Short had again seen the satellite, real or apparent, in the preceding year (1740), under similar circumstances, and with the same phase as Cassini had described; he had been informed of this in January, 1741, by M. Coste, "auteur de la Traduction du livre de l'Entendement Humain de Locke, et de plusieurs autres ouvrages;" and having communicated the observation to the Academy of Sciences, had been charged by that body to inquire more particularly concerning it, and report the result. But as Short had not seen the satellite again up to June, 1741, nothing further was ascertained than had been notified in the letter addressed to M. Coste, which was from "Mr. Turner, written from London, June 8."

Short's observation was "made in London, November 3, 1740, in the morning, with a reflecting telescope of 16½ English inches, and which magnified the diameter of the object from fifty to sixty times. He perceived at first what appeared to be a small star very near to Venus, upon which, having applied to his telescope a stronger eyepiece and a micrometer, he found the distance of the